

6. CURRENT REFERENCE

This circuit supplies a voltage to the current setting potentiometer on the front panel and to the remote control socket. The resulting voltage signal from the potentiometer is converted to a suitable reference voltage for the control amplifier (Block 7).

A separate winding on the control power transformer (K52) supplies 19 V AC to terminals B12 and B13. The output of voltage regulator VR2 is connected through diode D31 to terminal A3 (+). Terminal A2 is negative, and the voltage between them is 14-15 V.

The power supply to the remote control is current-limited to 60 mA in order to protect the circuit against, say, a short circuit in the remote control cable. The circuit is also capable of withstanding a short circuit between the remote control cable and the welding circuit.

The reference voltage from the potentiometer on the front panel or from the remote control device is applied between terminals A2 and A6, and is 0 V for minimum current and 14-15 V for maximum current. Terminal A6 is positive.

7. CONTROL AMPLIFIER MMA, TIG

This circuit regulates the welding current to a suitable value with regard to the set value of current and the arc voltage.

8. PULSE WIDTH MODULATOR

This block controls the frequency and pulse width of the control pulses to the MOSFET transistors. The pulse time must be 41-43% of the cycle time. The ratio of pulse time to cycle time is known as the duty cycle.

9. POWER MOS DRIVER

These circuits supply control pulses to the gate sources of the MOSFET transistors. There is a separate output for each transistor cooling fin block.

All gate circuits are galvanically separated from other circuits on the board (4 kV insulation voltage level between the pulse width modulator and the gate circuits).

DANGER -

NB: The gate circuits are at mains voltage.

The four circuits are identical, so only one is described below.

When transistor Q2 conducts, a voltage pulse with a peak value of 19 V appears at the secondary winding of the transformer. This pulse is led via D8, D9, S2 and output E1 to the gate of the MOSFET transistors, with the return circuit via the source, E2, D12 and C14. The peak voltage between gate and source is 15 V.

As the gate pulse is output on E1-E2, capacitor C14 is charged to 3.3 V via R16, R17, C13, D10 and D12.

When Q2 turns off, the output voltage from the pulse transformer changes polarity. Q5 and Q6 conduct automatically and pull down the gate voltage to -3.3 V, turning off the MOSFET transistors.

S2 and D11 protect the control board from overvoltage in the event of any fault in the main circuit.